

Implementation Aspects of the Random Demodulator for Compressive Sensing

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Abstract

The compressive sensing paradigm has gained significant attention from the applied sciences and engineering in recent years. The random demodulator is one of the compressive sensing architectures providing efficient sub-Nyquist sampling of sparse band-limited signals using simple off-the-shelf components. In order to accurately reconstruct the sub-sampled signal the theory requires a measurement matrix that accurately represents a model of the sampling front-end. When designing an electronic circuit one needs to realize that specific components might not perform exactly as expected. In this talk we address some of the practical aspects of the compressive sensing analog-to-digital architectures with emphasis on the random demodulator. We discuss how the filter components tolerances and finite resolution of the sampling device decreases signal reconstruction quality and what can be done to remedy this.

Keywords: compressed sensing, random demodulator, hardware imperfections, model-based calibration, quantization

Duration: \oplus 45 min.

References

- [1] Pawel Jerzy Pankiewicz, Thomas Arildsen, and Torben Larsen. Sensitivity of the Random Demodulation Framework to Filter Tolerances. In *Proceedings of the European Signal Processing Conference (EUSIPCO)*, pages 534–538, 2011.
- [2] Pawel Jerzy Pankiewicz, Thomas Arildsen, and Torben Larsen. Model-Based Calibration of Filter Imperfections in the Random Demodulator for Compressive Sensing. <http://sparsesampling.com/mbc>, March 2013.